

SECTION 07170
BENTONITE WATERPROOFING

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies bentonite panel waterproofing.
- B.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 02780 - UNIT PAVERS, Pavers.
 - 2. Section 07131 - SELF-ADHERING SHEET WATERPROOFING.
 - 3. Section 07141 - COLD FLUID-APPLIED WATERPROOFING.
 - 4. Section 07142 - HOT FLUID-APPLIED WATERPROOFING.

0.2 SUBMITTALS

- A.** Product Data: For each type of product indicated. Include product specifications and manufacturer's written installation instructions.
- B.** Shop Drawings: Show installation details for interface with other work.
- C.** Samples: For each of the following products, in sizes indicated:
 - 1. Waterproofing: 6 inches square.
 - 2. Flexible Flashing Membrane: 6 inches square.
 - 3. Protection Board: 6 inches square.
 - 4. Drainage Mat: 6 inches square.
- D.** Material Certificates: For each type of bentonite waterproofing, signed by manufacturers.
- E.** Preconstruction Test Reports: For water samples taken at Project site along with recommendations resulting from these tests.
- F.** Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- G.** Qualification Data: For Installer and for Testing and Inspection Agency.
- H.** Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.

- I. Test Reports: From Testing and Inspection Agency.
- J. Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

0.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain bentonite waterproofing system through one source from a single manufacturer. Obtain accessory products used with bentonite waterproofing from sources acceptable to bentonite waterproofing manufacturer.
- B. Preconstruction Testing: Engage a qualified independent testing agency to test water for compliance with requirements.
 - 1. Obtain water samples from Project site at approximate locations where waterproofing will be installed and test for acids, alkalis, brine, or other contaminants that may inhibit performance of waterproofing materials.
 - 2. Comply with manufacturer's written instructions for testing.
- C. Mockups: Build mockups to set quality standards for fabrication and installation.
 - 1. Approval of mockups is also for other material and construction qualities specifically approved by Engineer in writing.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Engineer in writing.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.

0.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original unopened and undamaged containers.
- B. Store materials in a dry, well-ventilated space.
- C. Remove and replace bentonite materials that have been prematurely exposed to moisture.

0.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit bentonite waterproofing to be

installed according to manufacturer's written instructions and warranty requirements.

1. Do not apply waterproofing materials to surfaces where ice or frost is visible. Do not apply bentonite waterproofing materials in areas with standing water.
2. Placing of bentonite clay products in panel or composite form on damp surfaces is allowed if approved in writing by manufacturer.

0.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of bentonite waterproofing system that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Water penetrating the building or structure resulting from substrate cracking of up to 1/8 inch.
 - b. Deteriorated or displaced waterproofing materials.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

0.1 GEOTEXTILE/BENTONITE SHEETS

A. Geotextile/Bentonite Waterproofing: Minimum of 1.1 lb/sq. ft. of bentonite clay granules between 2 layers of geotextile polypropylene fabric, one woven and one nonwoven, needlepunched and heat fused together.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CETCO; Voltex.
 - b. Carlisle Coatings & Waterproofing Inc.; CCW Clay Mat.
 - c. MiraDRI Moisture Protection Products, TC MiraDRI; MiraCLAY.

B. Contaminant-Resistant Geotextile/Bentonite Waterproofing: Minimum of 1.2 lb/sq. ft. of bentonite clay granules specially formulated for use in saltwater or contaminated ground-water, between 2 layers of geotextile polypropylene fabric, one woven and one nonwoven, needlepunched and heat fused together.

a.

0.2 INSTALLATION ACCESSORIES

- A.** Molded-Sheet Drainage Panels: Prefabricated, composite drainage panels, manufactured with a permeable geotextile facing laminated to a molded-plastic, three-dimensional sheet drainage core.
 - 1.
- B.** Termination Bar: Extruded-aluminum or formed-stainless-steel bars with upper flange to receive sealant.
- C.** Fasteners: Case-hardened nails or hardened-steel, powder-actuated fasteners. Depending on manufacturer's written requirements, provide 1/2- or 1-inch-diameter washers under fastener heads.
- D.** Sealants: As recommended in writing by waterproofing manufacturer. Comply with requirements specified in Section 07920 - Joint Sealants.
- E.** Tapes: As recommended in writing by waterproofing manufacturer for joints between sheets or panels.
- F.** Adhesive: Water-based adhesive used to secure membrane to both vertical and horizontal surfaces.

PART 3 - EXECUTION

0.1 EXAMINATION

- A.** Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate preparations affecting performance of bentonite waterproofing.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of bentonite waterproofing.
 - 2. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B.** Verify that substrate is complete and that all work that will penetrate waterproofing is complete and rigidly installed. Verify locations of waterproofing termination.

0.2 PREPARATION

- A.** Coordinate work in the vicinity of waterproofing to ensure proper conditions for installing the waterproofing system and to prevent damage to waterproofing after installation.

- B.** Formed Concrete Surfaces: Remove fins and projections. Fill voids, rock pockets, form-tie holes, and other defects greater than 1/8 with bentonite mastic or cementitious patching material according to manufacturer's written instructions.
- C.** Horizontal Concrete Surfaces: Remove debris, standing water, oily substances, mud, and similar substances that could impair the bonding ability of concrete or the effectiveness of waterproofing. Fill voids, cracks greater than 1/8 inch, honeycomb areas, and other defects with bentonite mastic or cementitious patching material according to manufacturer's written instructions.
- D.** Excavation Support and Protection or Stable Excavation: If water is seeping, use plastic sheets or other suitable means to prevent wetting the bentonite waterproofing. Fill minor gaps and spaces 1/8 inch wide or wider with wood, metal, concrete, or other appropriate filling material. Cover or fill large voids and crevices with cement mortar according to manufacturer's written instructions.

0.3 INSTALLATION, GENERAL

- A.** Install waterproofing and accessories according to manufacturer's written instructions, standard details, and recommended practices.
 - 1. Apply linear joint-sealing tubes, bentonite mastic, or both at changes of plane, construction joints in substrate, projections, and penetrations.
 - 2. Apply granular bentonite around penetrations in horizontal surfaces according to manufacturer's written instructions.
- B.** Static Construction Joints: Protect construction joints with bentonite preformed waterstop flexible strips. Either place concrete directly over flexible strips or press strips into preformed cavities. Comply with manufacturer's written instructions where joint waterproofing is not otherwise indicated.
- C.** Apply granular bentonite continuously at base of wall waterproofing (on footing, against wall) according to manufacturer's written instructions.
- D.** Protect waterproofing from damage and wetting before and during subsequent construction operations. Repair punctures, tears, and cuts according to manufacturer's written instructions.
- E.** Apply sealants to comply with requirements specified in Division 7 Section "Joint Sealants" and with manufacturer's written instructions.

0.4 GEOTEXTILE/BENTONITE PANEL INSTALLATION

- A.** General: Install a continuous layer of waterproofing sheets with woven geotextile side directly against concrete to be waterproofed. Lap ends and edges a minimum of 4 inches on horizontal and vertical substrates. Stagger end joints between sheets a minimum of 24 inches. Fasten seams by stapling to adjacent sheet or nailing to substrate.
- B.** Below Structural Slabs-on-Grade: Place waterproofing sheets on compacted substrate with woven geotextile side up with ends and edges lapped and stapled.
 - 1. Install a layer of waterproofing sheets under footings, grade beams, and pile caps; or continue waterproofing through key joints between footings and foundation walls, and extend a minimum of 8 inches up or beyond perimeter slab forms.
- C.** Concrete Walls: Starting at bottom of wall, apply waterproofing sheets horizontally with primary backing side against wall. Secure with powder-actuated fasteners or case-hardened, steel-cap masonry nails; spaced according to manufacturer's written instructions. Extend to bottom of footing, grade beam, or wall and secure as recommended in writing by manufacturer.
 - 1. Termination at Grade: Fasten top edge of waterproofing sheets to wall and protect top edge with sheet metal counterflashing. Cover waterproofing with a lapped course of plastic protection sheets if backfilling does not proceed immediately. Before backfilling, install a layer of protection board.
- D.** Excavation Support and Protection (Permanent Shoring): Encase tieback rods, nuts, and plates, using bentonite mastic and waterproofing sheets, according to waterproofing manufacturer's written instructions for each configuration.
 - 1. Install a layer of waterproofing sheets, with ends and edges lapped and nailed to shoring. Cover waterproofing with plastic protection sheets if needed for protection from precipitation; remove plastic sheets before placing concrete.
 - 2. Inspect and repair waterproofing after reinforcing steel has been placed. Coordinate and control concrete placement to avoid damage to waterproofing.
- E.** Horizontal Roofs, Plazas, and between Slabs: Starting at lowest point, install a layer of waterproofing sheets, with ends and edges lapped a minimum of 4 inches, fastening every 18 to 24 inches to hold material in place.
 - 1. Terminations at Vertical Surfaces: Provide fillet or cant at intersection of horizontal and vertical substrates. Extend

- waterproofing to top of curb or to a minimum of 6 inches above plane of waterproofing; secure top edge with sheet metal flashing.
2. Cover waterproofing with a plastic slip-sheet.

0.5 FIELD QUALITY CONTROL

- A.** Inspection: Arrange for manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions. Remove and replace applications of bentonite waterproofing where inspection indicates that it does not comply with specified requirements.
- B.** Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A.** Bentonite waterproofing will be measured as per square foot complete in place, including all preparation, accessories and incidentals.

0.2 PAYMENT

- A.** Payment for bentonite waterproofing will be made at the Contract unit price for the quantities as specified above.

0.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
0710.003	BENTONITE WATERPROOFING	SF

END OF SECTION

NOTES TO THE DESIGNER

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:

1. None